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Result Page

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The invention refers to an apparatus of the type indicated in the preamble of the first claim. A such apparatus is for example from the CSU 1206038 A known.

In the case of the resistance welding of sheets, whose surface in connection with the spot welding electrodes possesses a Anlegierungsneigung at the same, problems result regarding the stability of these conventional spot welding electrodes. In particular the problem of the Anlegierung at the electrodes arises with the stop welding of aluminium sheets, if the today still conventional electrodes or electrode caps become from copper alloys used. This problem results in addition, when welding coated plates, galvanized steel sheets as well as general of electrical high-conductive material. General one becomes by Anlegierung of aluminium or coating derivatives the electrode surface damaged, which cannot lead a service life reduction effected and furthermore to one no more sufficient strength of the spotweld as well as to sticking the electrodes together up to damages at the electrode surface.

As remedy it is from the CSU 1206038 A with a resistance welding electrode known, to provide whose electrode cap with a removable protective element light with wear. The protective element possesses an u-shaped foil strip section from an electrical and thermal good leadable material in the range of the electrode caps. The strip material becomes at the welding apparatus arranged coils up and unwound, so that if necessary always an unspent foil strip section rests against the electrode tip.

Adverse one is it with this arrangement that the known band control is place-robbing, so that with the known welding apparatus at poor accessible locations welded cannot become.

Object of the current invention is it to create here remedy.

According to invention these solve the problem by the features of the first claim. This solution has the advantage that the foil strip section rests not only against the electrode cap in the range of the welding points which can be set, but also each other opposite electrode sides. Thus the lateral space requirement in the range of the electrode tip does not become enlarged, so that still also at poor accessible locations welded can become. Beyond that the electrode does not only become and/or by the inventive arrangement. their caps, but also the side surfaces before damage protected. Here the foil protective element can be in outer ones, Ag, cu, aluminium as well as their alloys performed. Additional one can become the Anlegierungsneigung of the foil protection element by coating and/or suitable surface treatment minimized.

Like known, the protective element simple is more replaceable. Nevertheless for the fact concern must become supported that this protective element with the welding operation safe and complete at the electrode and/or. and against its side surfaces rests to their caps. For this the foil strip section can be received quasi a positive connection with the electrode, if it is in recesses in the electrode sides guided. At the electrode side surfaces and/or. those the cap can the foil strip section with its legs also fixed, in particular hung up be. Particularly favourably is it however, if the foil strip section is component of a foil strip completable of a coil. As soon as then the foil strip section lying close in the range of the electrode cap is worn, the foil strip can be moved on around a certain measure, according to which a new foil strip section comes in the wear-endangered range at the electrode to the request. Prefered one becomes this foil strip, which is wound on coils, between these coils guided and over the electrodes tensioned as well as with occurrence of manufacturing-relevant wear around a certain amount and/or. Path other clocked. The tape feed can become thereby by Direktantrieb or in the form of external driving mechanisms realized. The arrangement of the coils and/or. the guide of the foil strip must become the local circumstances adapted, in such a manner that this solution in stationary machines can become on the basis or robot-led welding tongs used. It can be recommendable, between the foil strip section as well as the electrode and/or. To plan electrode cap a slidable interlayer, in order to prevent a gluing of the foil to at the cap/electrode. This interlayer can be on the foil applied and be carbonaceous in particular, consist for example of graphite.

On the basis schematic diagrams two prefered embodiments of the invention become more near explained. It shows

Fig. 1 two welding electrodes with in each case a foil strip as protective element with the welding operation,

Fig. 2 the detailed view of the electrode cap of the embodiment after Fig. 1,

Fig. 3 the section A-A from Fig. 2, as well as

Fig. 4 the view of the electrode cap of an other embodiment of the invention.

With the reference numeral 1 are the two electrodes of a resistance spot welding gun referred, which are as usual at the two guides 2 of the pliers fixed not represented more near. With this spot welding gun two lying on top of one another sheets 3 are to become welded as usual with one another, D. h. in the welding point the two sheets become 3 1 against each other-pressed by the electrodes, whereby between the electrodes over the sheets 3 an high current

flow takes place point for point.

Over the electrodes 1 and/or. within the point range the planned to protect actual conventional electrode caps 4 against Oberflächenbeschädigungen is each electrode 1 a protective element from an electrical and thermal good conductive material associated. This protective element is 5 formed, which rests with its legs 6a, as foil strip section u-shaped in the cross section, 6b each other opposite electrode sides and/or side surfaces of the electrode cap and furthermore against the tip of the electrode cap 4. The foil strip sections 5 lie thus between the respective electrodes 1 and/or. their electrode caps 4 and the sheets 3 and protect the electrode caps 4 against damages, so for example against a Anlegierung of aluminium, if it concerns with the sheets 3 aluminum plates. Of course also each foil strip section 5 wears after a number of welding operations, however this foil strip section 5 simple is more replaceable, because in place of the worn foil strip section 5 in a simple manner new foil strip section 5 at the electrode 1 can and/or. Electrode cap 4 mounted become, as still explained becomes.

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Like the Fig. 2, 3 shows, is the foil strip section 5 in recesses 7 in the side surfaces of the electrode cap 4 and/or the electrode 1 guided. Thereby is ensured that the foil strip section 5 not lateral can slip from the tip of the electrode cap 4 and furthermore on its whole length and in particular with its legs 6a, 6b safe at the side surfaces of the electrode cap 4 and/or. lies close to the electrode 1. Like Fig. 4 shows, can at the side surfaces of the electrode cap 4 provided with the recesses 7 and/or. the electrode 1 in each case a suitable designed receptacle 8 provided its, into which the foil strip section 5 with its legs 6a, 6b is hung up. With a wear this u-shaped foil strip section can become 5 simple by the receptacles 8 removed and a new foil strip section 5 placed and/or. are hung up. The foil strip section must be 5 even not u-shaped, but possess only an essentially u-shaped cross section. So the band portion can exhibit for example also the form of a cap or a thimble.

With the embodiment after Fig. 1 however is the foil strip section 5 component one of a coil 9a of completable foil strip 10, whose is other end on a coil 9b wound. Each coil 9b can exhibit a suitable driving mechanism, that with a wear of the current foil strip section 5 the foil strip 10 between two welding operations, resting against the electrode cap 4, around a certain amount and/or. Path reforwards, so that a new foil strip section 5 at the electrode cap 4 comes to the request. In this way the exchange of the active in each case foil of band portion becomes 5 again significant simplified. The coils 9a, 9b at the guides can be 2 fixed, equally however another suitable attachment place is possible.

Altogether becomes with the help of the suggested, simple replaceable protection element for the electrode caps 4 and/or. Electrodes 1 of a resistance spot welding gun in the form of foil strip sections 5 an high availability of the welding systems achieved, whereby simultaneous highest process security is ensured. Since always a not worn welding electrode 1 comes to the use, always qualitative high-quality welding points become achieved. The protective element is more inexpensive in form of the foil strip section 5 not only simple replaceable, but also substantial, as if the electrode cap would have to become 4 even renewed with wear in each case.